

UNCLASSIFIED

AD NUMBER

AD480581

LIMITATION CHANGES

TO:

Approved for public release; distribution is unlimited. Document partially illegible.

FROM:

Distribution authorized to U.S. Gov't. agencies and their contractors;
Administrative/Operational Use; MAR 1965. Other requests shall be referred to Defense Advanced Research Projects Agency, ASBD-TIO, 675 North Randolph Street, Arlington, VA 22203-2114.

AUTHORITY

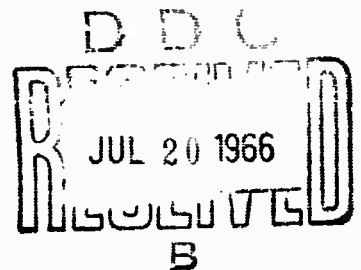
darpa ltr 6 dec 1972

THIS PAGE IS UNCLASSIFIED

Ionospheric Data Report — March 1965

IONOSPHERIC DATA: BANGKOK, THAILAND

Compiled by: VICHAI T. NIMIT



Prepared for:

U.S. ARMY ELECTRONICS LABORATORIES
FORT MONMOUTH, NEW JERSEY

CONTRACT DA-36-039-AMC-00040(E)
ORDER NO. 5384-PM-63-91

SPONSORED BY THE ADVANCED RESEARCH PROJECTS AGENCY
FOR THE
THAI U.S. MILITARY RESEARCH AND DEVELOPMENT CENTER
SUPREME COMMAND HEADQUARTERS
BANGKOK, THAILAND



STANFORD RESEARCH INSTITUTE
MENLO PARK, CALIFORNIA

**BEST
AVAILABLE COPY**

STANFORD RESEARCH INSTITUTE

MENLO PARK, CALIFORNIA



June 1965

Ionospheric Data Report — March 1965

IONOSPHERIC DATA: BANGKOK, THAILAND

Prepared for:

U.S. ARMY ELECTRONICS LABORATORIES
FORT MONMOUTH, NEW JERSEY

CONTRACT DA-36-039-AMC-00040(E)
ORDER NO. 5384-PM-63-91
PR&C NO. 64-ELN/D-6034
ARPA ORDER NO. 371

Compiled by: VICHAI T. NIMIT

SRI Project 4240

SPONSORED BY THE ADVANCED RESEARCH PROJECTS AGENCY
FOR THE
THAI-U.S. MILITARY RESEARCH AND DEVELOPMENT CENTER
SUPREME COMMAND HEADQUARTERS
BANGKOK, THAILAND

Copy No. **47**.....

CONTENTS

I	INTRODUCTION	1
II	TERMINOLOGY AND SYMBOLS	3
	A. Terminology	3
	B. Descriptive Letters	4
	C. Qualifying Letters	4
	D. Description of Standard Types of E _s	5
	E. Multiple Reflections from E _s	6
III	IONOSPHERIC DATA	7
	f _{min}	7
	f _o F ₂	8
	M(3000)F ₂	9
	h' F ₂	10
	h' F	11
	f _o F ₁	12
	M(3000)F ₁	13
	f _o E	14
	h' E	15
	f _b E _s	16
	f _o E _s	17
	h' E _s	18
	Types of E _s	19
	Median Values	20

ILLUSTRATIONS

Fig. 1	Summary Graphs	21
--------	--------------------------	----

I INTRODUCTION

Ionospheric observations are being carried out at the Laboratory of the Military Research and Development Center at Bangkok, Thailand, a joint United States-Thailand organization. A Model C-2 vertical-incidence sounder supplied and operated by the United States Army Radio Propagation Agency has been installed there. Table I gives pertinent information about the site.

Table I
VERTICAL-INCIDENCE SOUNDER SITE
AT BANGKOK, THAILAND

Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
13.73°N	100.57°E	2.5°N	169.83°E

Dip angle: 10°N

Distance from dip equator: 450 km

Equipment:

Instrument: Type C2 (automatic)

PRF: 60 pps

Frequency sweep time: 30 sec

Frequency sweep range: 1 to 25 Mc

Pulse duration: 50 μ sec

Peak pulse power: approximately 10 kw.

The cooperation and participation of staff members of the Thailand Ministry of Defense and the support of the United States Advanced Research

Projects Agency, the United States Army Electronics Laboratories, and the United States Army Radio Propagation Agency made it possible for the data presented in this report to be accumulated.

II TERMINOLOGY AND SYMBOLS

The terminology and symbols used in this data report are in accordance with the conventions established by the World Wide Soundings Committee.¹

A. TERMINOLOGY

f_oF_2 f_oF_1 f_oE	The ordinary wave critical frequency for the F ₂ and F ₁ layers and the E region, respectively.
f_oE_s	The ordinary wave top frequency corresponding to the highest frequency at which a mainly continuous E _s trace is observed.
f_bE_s	The blanketing frequency of an E _s layer, i.e., the lowest ordinary wave frequency at which the E _s layer begins to become transparent. (This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.)
f_{min}	The frequency below which no echoes are observed.
$M(3000)F_2$	The maximum usable frequency factor for a path of 3000 km for transmission by the F ₂ layer.
$h'F_2$	The minimum virtual height of the ordinary wave trace for the highest stable stratification in the F region.
$h'F$	The most significant F-region virtual height parameter, that for the lowest F-region stratification. (Thus $h'F$ is identical with the current $h'F_2$ when F-region stratification is absent, i.e., at night, and with current $h'F_1$ when F ₁ stratification is present.)

¹W. R. Piggott and K. Rawer, URSI Handbook of Ionogram Interpretation and Reduction of the World Wide Sounding Committee (Elsevier Publishing Company, Amsterdam, London, New York, 1961).

B. DESCRIPTIVE LETTERS

Certain effects observed on ionograms may make it difficult or impossible to obtain accurate numerical values. The descriptive letters listed below, when used alone indicate, in general, the presence of a phenomenon that may have influenced the measurement. Qualifying letters (Sec. C) indicate the nature of the uncertainty.

- A A lower thin layer present, e.g., E_s
- B Absorption in the vicinity of f_{min}
- C Any non-ionospheric reason
- D The upper limit of the normal frequency range
- E The lower limit of the normal frequency range
- F Spread echoes present
- G Ionization density of the layer too small for measurement
- H Stratification present
- L No sufficiently definite cusp between layers of the trace
- M Ordinary and extraordinary components indistinguishable
- N Conditions such that the measurement cannot be interpreted
- O Measurement referring to the ordinary component
- R Attenuation in the vicinity of a critical frequency
- S Interference or atmospherics
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful
- V Forked trace
- W Echo lying outside the height range recorded
- X Measurement referring to the extraordinary component
- Y Intermittent trace
- Z Third magneto-ionic component present.

C. QUALIFYING LETTERS

- D Greater than. . .
- E Less than. . .

- I An interpolated value
- J Ordinary component characteristic deduced from the extraordinary component
- O Extraordinary component characteristic deduced from the ordinary component
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful
- U Uncertain numerical value
- Z Measurement deduced from the third magneto-ionic component.

D. DESCRIPTION OF STANDARD TYPES OF E_s

The eight standard types of E_s are identified by lower-case letters: f, l, c, h, q, r, a, and s. These letters suggest the corresponding names, flat, low, cusp, high, equatorial, retardation, auroral, and slant, respectively, but are not restrictive. The letter n is used to designate an E_s trace that does not correspond to one of the eight types. The classifications are:

- f An E_s trace showing no appreciable increase of height with frequency, usually relatively solid at most latitudes. (This classification may be used only at night; it appears that flat E_s traces observed in the daytime are classified according to their virtual height: h or l.)
- l A flat E_s trace at or below the normal E-region minimum virtual height in the day or below the E-region minimum virtual height at night.
- c An E_s trace showing a relatively symmetrical cusp at or below $f_o E$. (This is usually continuous with the normal E trace, although when the deviative absorption is large, part or all of the cusp may be missing—usually a daytime type.)
- h An E_s trace showing a discontinuity in height with the normal E-region trace at or above $f_o E$ and an asymmetrical cusp. (The low-frequency end of the E_s trace lies clearly above the high-frequency end of the normal E trace—usually a daytime type.)
- q An E_s trace that is diffuse and nonblanketing over a wide frequency range, the spread being most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)
- r An E_s trace that is nonblanketing over part or all of its frequency range, showing an increase in virtual height at the high-frequency

end similar to group retardation. (This is distinguished from the usual group retardation—as in the case of an occulting thick E region—by the lack of group retardation in the F traces at corresponding frequencies and the lack of complete blanketing.)

- a An E_s pattern having a well-defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. (These sometimes extend over several hundred kilometers of virtual height.)
- s A diffuse E_s trace that rises steadily with frequency, usually emerging from another type of E_s trace. (The rising trace alone is classified as s; the horizontal trace is classified separately. At high latitudes, the slant trace usually starts to rise from a horizontal E_s trace, such as ! or f, at frequencies that greatly exceed the E-region critical frequency, e.g., about 6 Mc; whereas at low latitudes it usually rises from equatorial-type E_s, q, c, or h, at frequencies near the regular E critical frequency. Type s is never used to determine f_oE unless echoes clearly identifiable as E_s echoes are seen.)
- n An E trace that cannot be classified as one of the standard types. (This must not be used for intermediate cases between any two classes. A choice should always be made whenever possible, even if it is doubtful.)

E. MULTIPLE REFLECTIONS FROM E_s

When the ionogram shows the presence of multiple reflections from E_s, the number of traces seen will be recorded with the letter indicating the type.

Characteristic: fmin

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 100 Kc

March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C
14	E028C	E019C	013	013	012	E019C	B	E025C	E029C	E032C	E036C	E031C
15	E020C	E015C	011	011	015	020	B	025	030	034	E033C	041
16	E025S	E023S	014	014	015	016	E027S	E030S	E027S	E031S	E031S	E030S
17	024	022	021	021	020	022	B	023	024	E027S	E029S	E028S
18	E022S	015	013	011	011	014	E024S	E024S	E028S	E028S	033	041
19	E020S	014	013	011	C	C	C	C	C	C	C	C
20	018	015	014	012	013	015	024	E029S	030	035	033	E030S
21	023	015	015	012	013	016	E025S	E025S	031	033	036	036
22	018	013	015	015	015	015	028	E030S	E029S	033	C	045
23	015	013	012	012	014	015	E019S	020	028	030	C	035
24	017	015	013	011	013	B	020	023	028	032	029	031
25	014	013	011	011	E	014	020	020	019	023	028	028
26	017	014	011	012	012	E015S	020	020	028	032	E027S	030
27	016	015	011	E	011	E015S	E018S	021	027	031	034	029
28	023	014	014	012	011	017	020	024	028	E028S	033	029
29	016	015	012	012	013	E015S	E019S	023	028	031	035	034
30	018	015	014	012	E	E016S	019	020	028	024	035	E030S
31	022	014	014	013	E	E016S	E017S	020	020	024	C	C
Median	019	015	013	012	013	015	020	023	028	031	033	030
Count	18	18	18	17	14	16	14	17	17	17	14	16
UQ	023	015	014	013	015	016	024	025	029	032	035	035
LQ	017	014	012	011	012	015	019	020	027	028	029	030
QR	6	1	2	2	3	1	5	5	2	4	6	5

* Tabulation of 031 = 3.1 Mc.

IONOSPHERIC DATA
 to 25 Mc in 0.5 minute
 March 1965

10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	E030C	E030C	C	C	C	031*	030	E030C	E030C	E030C	E030C	E026C
036C	E031C	E030C	E030C	E044C	036	034	031	E028C	E027C	E024C	E030C	E030C	E023C
043C	041	045	059	055	054	030	E029C	E028C	E027C	E030C	E028C	E026C	E025C
031E	E030S	036	E030S	037	035	033	E028S	E026S	E024S	E024S	E025S	E023S	E030S
029S	E028S	C	C	C	034	C	E025S	E025S	E020S	E024S	E025S	E023S	E022S
033	041	031	030	028	C	026	020	025	E025S	E030S	E029S	E030S	E024S
C	C	C	036	043	036	033	E030S	E026S	E023S	E030S	E027S	026	017
033	E030S	031	039	038	035	031	031	E026S	E028S	E032S	E030S	E027S	017
036	036	037	040	039	034	030	E020S	028	029	029	029	028	020
C	045	E031S	E030S	028	030	026	028	021	020	020	020	020	017
C	035	038	030	035	033	032	026	020	020	019	019	020	018
029	031	C	030	030	027	033	020	019	020	019	018	018	017
028	028	030	030	030	028	023	020	018	019	020	017	E018S	019
027S	030	035	035	034	023	026	019	022	025	019	019	019	017
034	029	E028S	E029S	029	026	021	020	E019S	020	019	E019S	020	020
033	029	030	030	030	028	024	023	019	020	018	019	E019S	018
035	034	035	030	035	030	025	025	025	020	020	020	019	018
035	E030S	E030S	035	036	035	026	026	020	020	020	020	020	018
C	C	E030S	027	025	034	021	025	019	024	020	020	020	018
033	030	031	030	035	034	026	025	025	023	020	020	020	018
14	16	16	18	17	17	17	19	19	19	19	19	19	19
035	035	035	035	033	035	032	029	026	027	030	029	027	023
029	030	030	030	030	028	025	020	019	020	019	019	019	019
6	5	5	5	8	7	7	9	7	7	11	10	8	6

Characteristic: foF2

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in

March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C
14	D074C	D080C	071	042	F	024	B	045	065	068	070	072
15	081	S	060	042	029	A	B	050	070	075	071	071
16	S	S	J053S	037	029	023	A	048	072	076	077	067
17	R	074	F	F	023	A	B	049	063	066	067	068
18	072	F	F	F	F	A	A	049	065	058	060	061
19	F	073	058	040	C	C	C	C	C	C	C	C
20	070	071	046	027	024	A	A	056	071	081	075	071
21	071	076	F	028	A	A	A	056	071	087	092	U085R
22	F	F	F	F	032	023	B	059	075	078	068	062
23	F	R	068	F	034	027	026	055	073	083	C	070
24	C55	059	056	A	A	B	C24	056	070	075	071	070
25	067	061	043	028	024	017	025	061	076	085	089	089
26	071	075	058	031	A	A	028	057	074	085	087	086
27	080	085	074	041	A	A	026	058	074	085	092	097
28	075	081	056	036	023	B	025	060	078	085	089	083
29	086	085	048	034	A	018	021	056	076	080	091	085
30	F	096	F	030	026	020	023	055	075	089	090	J095S
31	S	088	058	037	F	018	022	055	073	083	C	C
Median	072	076	058	036	026	022	025	056	073	083	071	072
Count	11	13	13	13	9	8	9	17	17	17	15	16
UQ	080	085	064	040	030	025	026	058	075	085	090	085
LQ	070	072	051	029	024	018	023	050	070	075	070	069
QR	10	13	13	11	6	7	3	8	5	10	20	16

* Tabulation of 077 = 7.7 Mc.

Mc to 25 Mc in 0.5 minute

March 1965

[illegible]

Characteristic: M(3000)F2

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in

March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	355	370	F	340	B	320	270	265	265	255
15	340	S	350	345	340	A	B	320	305	270	265	270
16	S	S	S	340	320	320	A	325	260	260	270	275
17	R	380	F	F	370	A	B	325	300	265	245	265
18	380	F	F	F	F	A	A	340	280	290	260	260
19	F	370	350	330	C	C	C	C	C	C	C	C
20	345	370	370	345	345	A	A	345	330	280	270	265
21	330	375	F	355	A	A	A	350	340	330	300	U245R
22	F	F	F	F	335	350	B	340	360	255	240	270
23	F	R	360	F	360	355	310	360	335	290	C	250
24	310	330	380	A	A	B	300	320	270	270	270	270
25	330	370	360	335	345	350	310	345	325	300	265	235
26	320	350	380	350	A	A	310	320	305	270	265	260
27	315	350	370	360	A	A	270	345	335	315	295	255
28	320	350	350	350	340	B	320	345	330	300	255	250
29	330	360	335	340	A	350	310	340	330	315	265	240
30	F	360	F	315	295	330	330	335	335	315	280	S
31	S	350	365	350	F	330	330	335	310	270	C	C
Median	330	360	360	345	340	345	310	340	325	280	265	260
Count	10	12	12	13	9	8	9	17	17	17	15	15
UQ	340	370	370	352	352	350	325	345	335	307	270	270
LQ	320	350	350	338	328	330	305	323	290	268	260	250
QR	20	20	20	14	24	20	20	22	45	39	10	20

* Tabulation of 275 = factor of 2.75

Mc to 25 Mc in 0.5 minute

March 1965

[illegible]

Characteristic: h'F₂

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in
March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	-	-	-	-	-	-	-	C	C	C	C	C
2	-	-	-	-	-	-	-	C	C	C	C	C
3	-	-	-	-	-	-	-	C	C	C	C	C
4	-	-	-	-	-	-	-	C	C	C	C	C
5	-	-	-	-	-	-	-	C	C	C	C	C
6	-	-	-	-	-	-	-	C	C	C	C	C
7	-	-	-	-	-	-	-	C	C	C	C	C
8	-	-	-	-	-	-	-	C	C	C	C	C
9	-	-	-	-	-	-	-	C	C	C	C	C
10	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	C	C	C	C	C
12	-	-	-	-	-	-	-	C	C	C	C	C
13	-	-	-	-	-	-	-	C	C	C	C	C
14	-	-	-	-	-	-	-	-	L	L	340	360
15	-	-	-	-	-	-	-	-	L	L	335	360
16	-	-	-	-	-	-	-	-	L	320	330	-
17	-	-	-	-	-	-	-	L	330	320	E380A	350
18	-	-	-	-	-	-	-	-	L	L	410	400
19	-	-	-	-	-	-	-	C	C	C	C	C
20	-	-	-	-	-	-	-	-	300	330	360	L
21	-	-	-	-	-	-	-	-	280	300	320	355
22	-	-	-	-	-	-	-	-	L	L	L	360
23	-	-	-	-	-	-	-	L	L	L	-	370
24	-	-	-	-	-	-	-	-	L	L	320	350
25	-	-	-	-	-	-	-	L	L	L	327	350
26	-	-	-	-	-	-	-	L	L	L	330	330
27	-	-	-	-	-	-	-	L	280	E300A	L	350
28	-	-	-	-	-	-	-	245	L	L	344	350
29	-	-	-	-	-	-	-	-	285	310	L	360
30	-	-	-	-	-	-	-	250	280	300	320	250
31	-	-	-	-	-	-	-	-	310	330	C	C
Median	-	-	-	-	-	-	-	-	285	315	336	353
Count	-	-	-	-	-	-	-	2	7	8	12	14
UQ	-	-	-	-	-	-	-	-	310	325	352	360
LQ	-	-	-	-	-	-	-	-	280	300	328	350
QR	-	-	-	-	-	-	-	-	30	25	24	10

*
Tabulation of 330 = 330 km.

IONOSPHERIC DATA
Mc to 25 Mc in 0.5 minute
March 1965

10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	330*	340	C	C	C	L	-	-	-	-	-	-
340	360	370	360	340	330	L	L	-	-	-	-	-	-
335	360	340	E400B	360	E350B	L	L	-	-	-	-	-	-
330	-	320	310	320	305	310	L	-	-	-	-	-	-
E380A	350	C	C	C	A	C	A	-	-	-	-	-	-
410	400	400	400	340	C	280	L	L	-	-	-	-	-
C	C	C	340	320	310	290	L	-	-	-	-	-	-
360	L	350	360	360	320	288	L	-	-	-	-	-	-
320	355	350	L	368	340	300	L	-	-	-	-	-	-
L	360	380	360	360	330	290	L	-	-	-	-	-	-
-	370	360	L	330	290	270	L	-	-	-	-	-	-
320	350	348	L	330	305	295	L	-	-	-	-	-	-
327	350	350	E350A	E340A	E350A	300	E292A	-	-	-	-	-	-
330	330	340	L	340	307	L	L	-	-	-	-	-	-
L	350	330	310	340	320	320	300	-	-	-	-	-	-
344	350	350	330	L	320	300	L	-	-	-	-	-	-
L	360	350	E370A	350	E360A	E320A	L	-	-	-	-	-	-
338	250	335	350	330	310	L	L	-	-	-	-	-	-
C	C	350	360	332	310	L	L	-	-	-	-	-	-
336	353	350	355	340	320	298	-	-	-	-	-	-	-
12	14	17	14	16	16	12	2	-	-	-	-	-	-
352	360	355	360	355	335	305	-	-	-	-	-	-	-
328	350	338	340	330	309	289	-	-	-	-	-	-	-
24	10	17	20	25	26	16	-	-	-	-	-	-	-

2

Characteristic: h'F

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in C
March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C
14	240	240	220	210	230	U300S	B	E260C	240	215	220	205
15	210	230	220	220	230	A	B	250	E240B	220	E210C	E220B
16	210	220	210	230	250	E300A	A	E250S	220	210	210	-
17	220	210	210	220	240	A	B	240	E230A	210	A	210
18	220	212	210	220	E250A	A	A	250	218	210	200	240
19	U235F	210	200	220	C	C	C	C	C	C	C	C
20	238	220	200	220	260	A	A	250	E260A	220	210	E200A
21	250	210	200	210	A	A	A	230	230	E255A	E250A	205
22	U280F	250	220	E240A	240	E280A	B	E240A	E230A	220	200	E210B
23	240	220	200	E220A	230	230	E290A	235	E240A	210	C	200
24	255	250	210	A	A	B	E330B	240	220	210	200	180
25	245	210	200	226	E247A	E280A	E300B	230	230	234	E280A	A
26	250	232	209	E240A	A	A	F340A	E260A	E244A	220	E200A	210
27	260	230	220	210	A	A	E300A	240	E260A	A	340	A
28	270	240	210	220	240	B	E300B	A	230	220	220	205
29	240	220	210	230	A	E270A	E350S	250	235	A	210	E260A
30	260	230	210	220	247	E300A	E300A	A	320	E290A	E240A	170H
31	U250S	220	200	210	240	E320A	E325A	240	230	200H	C	C
Median	242	220	210	220	240	290	300	240	230	220	210	205
Count	18	18	18	17	12	8	9	15	17	15	14	13
UQ	255	232	210	228	248	300	335	250	242	220	240	215
LQ	235	212	200	215	235	275	300	240	230	210	200	200
QR	20	20	10	13	15	25	35	10	12	10	40	15

* Tabulation of 200 = 200 km.

IONOSPHERIC DATA
 c to 25 Mc in 0.5 minute
 March 1965

10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	200*	E220A	C	C	C	233	E260B	E220A	U340F	270	U230C	250
220	205	200	200	200	E205B	240	E230B	E260C	300	E300A	U300F	E250C	E230C
E210C	E220B	B	B	B	B	E245A	E230A	258	300	U300F	U240F	230	225
210	-	E200B	200	180H	E200B	230	E250A	E260A	290	290	250	U230S	U220S
A	210	C	C	C	A	C	A	E350A	310	U300S	U240F	250	240
200	240	185	190	180	C	180	E235A	260	E300S	U320F	U250F	U230F	240
C	C	C	200	E190B	E180B	E230B	E240S	260	E270S	E270S	E240S	240	245
210	E200A	E210A	E200B	E220A	E200A	E220B	E230B	E250S	300	E305S	U240F	230	E290A
E250A	205	200	E200B	E200B	E200A	E225A	E245A	250	270	300	U270F	U230F	240
200	E210B	200	200	180	170	180	E220B	245	290	320	260	220	240
C	200	200	180	180	190	220	210	245	260	230	220	240	250
200	180	E200A	E265A	E200A	E200A	190	230	250	265	240	228	230	240
E280A	A	A	A	A	A	A	A	255	260	270	240	248	240
E200A	210	210	210	210	200		E235A	270	290	270	245	230	240
340	A	180H	E230A	E280A	E300A		E280A	E280A	265	245	230	232	250
220	205	210	200	200	190	E240A	232	270	280	290	260	250	250
210	E260A	A	A	A	A	A	240	250	280	270	260	235	260
E240A	170H	E230A	200	200	E200B	E230A	E250A	260	275	270	240	250	245
C	C	190	190	200	200	E200A	E220A	E270A	E300B	U280S	U240S	240	U220S
210	205	200	200	200	200	228	235	260	280	290	240	232	240
14	13	14	15	14	13	14	17	19	19	19	19	19	19
240	215	210	210	200	200	230	248	270	300	300	260	248	250
200	200	200	200	180	190	200	230	250	265	270	240	230	240
40	15	10	10	20	10	30	18	20	35	30	20	18	10

Characteristic: foF1

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 1

March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	-	-	-	-	-	-	-	C	C	C	C	C
2	-	-	-	-	-	-	-	C	C	C	C	C
3	-	-	-	-	-	-	-	C	C	C	C	C
4	-	-	-	-	-	-	-	C	C	C	C	C
5	-	-	-	-	-	-	-	C	C	C	C	C
6	-	-	-	-	-	-	-	C	C	C	C	C
7	-	-	-	-	-	-	-	C	C	C	C	C
8	-	-	-	-	-	-	-	C	C	C	C	C
9	-	-	-	-	-	-	-	C	C	C	C	C
10	-	-	-	-	-	-	-	C	C	C	C	C
11	-	-	-	-	-	-	-	C	C	C	C	C
12	-	-	-	-	-	-	-	C	C	C	C	C
13	-	-	-	-	-	-	-	C	C	C	C	C
14	-	-	-	-	-	-	-	-	L	L	044	045
15	-	-	-	-	-	-	-	-	L	L	R	R
16	-	-	-	-	-	-	-	-	L	U041L	U044L	U044L
17	-	-	-	-	-	-	-	L	L	U041L	A	044
18	-	-	-	-	-	-	-	-	L	041	043	043
19	-	-	-	-	-	-	-	C	C	C	C	C
20	-	-	-	-	-	-	-	-	L	042	043	U045L
21	-	-	-	-	-	-	-	-	L	L	040	045
22	-	-	-	-	-	-	-	-	L	L	044	044
23	-	-	-	-	-	-	-	L	L	L	C	044
24	-	-	-	-	-	-	-	-	L	L	U044L	045
25	-	-	-	-	-	-	-	L	L	L	U044L	A
26	-	-	-	-	-	-	-	L	L	042	L	U045L
27	-	-	-	-	-	-	-	L	L	A	L	A
28	-	-	-	-	-	-	-	A	L	L	U044L	045
29	-	-	-	-	-	-	-	-	L	A	U045L	045
30	-	-	-	-	-	-	-	A	L	L	044	045
31	-	-	-	-	-	-	-	-	L	U042L	C	C
Median	-	-	-	-	-	-	-	-	-	042	044	045
Count	-	-	-	-	-	-	-	-	-	6	11	13
UQ	-	-	-	-	-	-	-	-	-	042	044	045
LQ	-	-	-	-	-	-	-	-	-	041	043	044
QR	-	-	-	-	-	-	-	-	-	1	1	1

* Tabulation of 044 = 4.4 Mc.

Mc to 25 Mc in 0.5 minute

10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	044*	044	C	C	C	L	-	-	-	-	-	-
044	045	046	045	U043L	U042L	L	L	-	-	-	-	-	-
R	R	B	B	B	B	L	L	-	-	-	-	-	-
U044L	U044L	045	044	043	042	L	L	-	-	-	-	-	-
A	C44	C	C	C	A	C	A	-	-	-	-	-	-
043	043	044	044	043	C	L	L	L	-	-	-	-	-
C	C	C	044	043	U044L	L	L	-	-	-	-	-	-
043	U045L	045	044	044	U042L	L	L	-	-	-	-	-	-
040	045	045	045	044	U043L	L	L	-	-	-	-	-	-
044	044	045	044	043	U042L	L	L	-	-	-	-	-	-
C	044	045	L	U044L	U042L	L	L	-	-	-	-	-	-
U044L	045	045	044	044	U043L	L	L	-	-	-	-	-	-
U044L	A	A	A	A	A	A	A	-	-	-	-	-	-
L	U045L	045	044	U045L	U044L	L	L	-	-	-	-	-	-
L	A	045	044	U045L	U043L	A	L	-	-	-	-	-	-
U044L	045	045	045	U045L	U045L	L	L	-	-	-	-	-	-
U045L	045	A	A	A	A	A	L	-	-	-	-	-	-
044	045	045	044	U044L	L	L	L	-	-	-	-	-	-
C	C	045	046	U044L	U045L	L	L	-	-	-	-	-	-
044	045	045	044	044	C43	-	-	-	-	-	-	-	-
11	13	14	14	14	12	-	-	-	-	-	-	-	-
044	045	045	045	044	044	-	-	-	-	-	-	-	-
043	044	045	044	043	042	-	-	-	-	-	-	-	-
1	1	0	1	1	2	-	-	-	-	-	-	-	-

Characteristic: M(3000)F1

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in
March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	-	-	-	-	-	-	-	C	C	C	C	C
2	-	-	-	-	-	-	-	C	C	C	C	C
3	-	-	-	-	-	-	-	C	C	C	C	C
4	-	-	-	-	-	-	-	C	C	C	C	C
5	-	-	-	-	-	-	-	C	C	C	C	C
6	-	-	-	-	-	-	-	C	C	C	C	C
7	-	-	-	-	-	-	-	C	C	C	C	C
8	-	-	-	-	-	-	-	C	C	C	C	C
9	-	-	-	-	-	-	-	C	C	C	C	C
10	-	-	-	-	-	-	-	C	C	C	C	C
11	-	-	-	-	-	-	-	C	C	C	C	C
12	-	-	-	-	-	-	-	C	C	C	C	C
13	-	-	-	-	-	-	-	C	C	C	C	C
14	-	-	-	-	-	-	-	-	L	L	390	380
15	-	-	-	-	-	-	-	-	L	L	R	R
16	-	-	-	-	-	-	-	-	L	U385L	U390L	U405L
17	-	-	-	-	-	-	-	L	L	U380L	A	410
18	-	-	-	-	-	-	-	-	L	390	400	415
19	-	-	-	-	-	-	-	C	C	C	C	C
20	-	-	-	-	-	-	-	-	L	390	400	U405L
21	-	-	-	-	-	-	-	-	L	L	390	395
22	-	-	-	-	-	-	-	-	L	L	400	410
23	-	-	-	-	-	-	-	L	L	L	C	420
24	-	-	-	-	-	-	-	-	L	L	U395L	400
25	-	-	-	-	-	-	-	L	L	L	U365L	A
26	-	-	-	-	-	-	-	L	L	390	L	U385L
27	-	-	-	-	-	-	-	L	L	A	L	A
28	-	-	-	-	-	-	-	A	L	L	U390L	380
29	-	-	-	-	-	-	-	-	L	A	U380L	375
30	-	-	-	-	-	-	-	A	L	L	370	395
31	-	-	-	-	-	-	-	-	L	U370L	C	C
Median	-	-	-	-	-	-	-	-	-	388	390	400
Count	-	-	-	-	-	-	-	-	-	6	11	13
UQ	-	-	-	-	-	-	-	-	-	390	400	410
LQ	-	-	-	-	-	-	-	-	-	380	380	388
QR	-	-	-	-	-	-	-	-	-	10	20	22

* Tabulation of 400 = factor of 4.0.

ATMOSPHERIC DATA
to 25 Mc in 0.5 minute
March 1965

10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	410*	400	C	C	C	L	-	-	-	-	-	-
390	380	385	405	U410L	U390L	L	L	-	-	-	-	-	-
R	R	B	B	B	B	L	L	-	-	-	-	-	-
390L	U405L	400	420	410	390	L	L	-	-	-	-	-	-
A	410	C	C	C	A	C	A	-	-	-	-	-	-
400	415	430	425	340	C	L	L	L	-	-	-	-	-
C	C	C	415	420	U380L	L	L	-	-	-	-	-	-
400	U405L	405	410	410	U390L	L	L	-	-	-	-	-	-
390	395	400	410	390	U385L	L	L	-	-	-	-	-	-
400	410	415	430	430	U400L	L	L	-	-	-	-	-	-
C	420	420	L	U400L	U385L	L	L	-	-	-	-	-	-
395L	400	400	380	385	U390L	L	L	-	-	-	-	-	-
365L	A	A	A	A	A	A	A	-	-	-	-	-	-
L	U385L	400	415	U390L	U370L	L	L	-	-	-	-	-	-
L	A	400	395	U360L	U350L	A	L	-	-	-	-	-	-
390L	390	400	400	U395L	U370L	L	L	-	-	-	-	-	-
380L	375	A	A	A	A	A	L	-	-	-	-	-	-
370	395	390	400	U395L	L	L	L	-	-	-	-	-	-
C	C	420	415	U410L	U380L	L	L	-	-	-	-	-	-
39C	400	400	410	397	385	-	-	-	-	-	-	-	-
11	13	14	14	14	12	-	-	-	-	-	-	-	-
400	410	415	415	410	390	-	-	-	-	-	-	-	-
380	388	400	400	390	375	-	-	-	-	-	-	-	-
20	22	15	15	20	15	-	-	-	-	-	-	-	-

Characteristic: foF

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in
March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	-	-	-	-	-	-	-	C	C	C	C	C
2	-	-	-	-	-	-	-	C	C	C	C	C
3	-	-	-	-	-	-	-	C	C	C	C	C
4	-	-	-	-	-	-	-	C	C	C	C	C
5	-	-	-	-	-	-	-	C	C	C	C	C
6	-	-	-	-	-	-	-	C	C	C	C	C
7	-	-	-	-	-	-	-	C	C	C	C	C
8	-	-	-	-	-	-	-	C	C	C	C	C
9	-	-	-	-	-	-	-	C	C	C	C	C
10	-	-	-	-	-	-	-	C	C	C	C	C
11	-	-	-	-	-	-	-	C	C	C	C	C
12	-	-	-	-	-	-	-	C	C	C	C	C
13	-	-	-	-	-	-	-	C	C	C	C	C
14	-	-	-	-	-	-	-	-	C	C	C	D320R
15	-	-	-	-	-	-	-	-	B	B	C	B
16	-	-	-	-	-	-	-	-	B	B	B	A
17	-	-	-	-	-	-	-	A	A	A	A	A
18	-	-	-	-	-	-	-	-	-	A	B	B
19	-	-	-	-	-	-	-	C	C	C	C	C
20	-	-	-	-	-	-	-	-	B	B	B	A
21	-	-	-	-	-	-	-	-	B	B	B	B
22	-	-	-	-	-	-	-	-	A	B	A	B
23	-	-	-	-	-	-	-	B	B	B	C	E
24	-	-	-	-	-	-	-	-	B	U310R	R	R
25	-	-	-	-	-	-	-	B	A	R	R	R
26	-	-	-	-	-	-	-	B	B	B	A	D330R
27	-	-	-	-	-	-	-	A	R	B	B	A
28	-	-	-	-	-	-	-	A	B	A	B	340
29	-	-	-	-	-	-	-	-	B	B	B	B
30	-	-	-	-	-	-	-	R	B	A	B	A
31	-	-	-	-	-	-	-	-	A	A	C	C
Median	-	-	-	-	-	-	-	-	-	-	-	-
Count	-	-	-	-	-	-	-	-	-	1	-	3
UQ	-	-	-	-	-	-	-	-	-	-	-	-
LQ	-	-	-	-	-	-	-	-	-	-	-	-
QR	-	-	-	-	-	-	-	-	-	-	-	-

* Tabulation of 330 = 3.3 Mc.

Mc to 25 Mc in 0.5 minute

[illegible]

Characteristic: h'F

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 1

March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E. Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	-	-	-	-	-	-	-	C	C	C	C	C
2	-	-	-	-	-	-	-	C	C	C	C	C
3	-	-	-	-	-	-	-	C	C	C	C	C
4	-	-	-	-	-	-	-	C	C	C	C	C
5	-	-	-	-	-	-	-	C	C	C	C	C
6	-	-	-	-	-	-	-	C	C	C	C	C
7	-	-	-	-	-	-	-	C	C	C	C	C
8	-	-	-	-	-	-	-	C	C	C	C	C
9	-	-	-	-	-	-	-	C	C	C	C	C
10	-	-	-	-	-	-	-	C	C	C	C	C
11	-	-	-	-	-	-	-	C	C	C	C	C
12	-	-	-	-	-	-	-	C	C	C	C	C
13	-	-	-	-	-	-	-	C	C	C	C	C
14	-	-	-	-	-	-	-	-	C	C	C	D120C
15	-	-	-	-	-	-	-	-	B	B	C	B
16	-	-	-	-	-	-	-	-	B	B	B	A
17	-	-	-	-	-	-	-	A	A	A	A	A
18	-	-	-	-	-	-	-	-	A	A	B	B
19	-	-	-	-	-	-	-	C	C	C	C	C
20	-	-	-	-	-	-	-	-	B	B	B	A
21	-	-	-	-	-	-	-	-	B	B	B	B
22	-	-	-	-	-	-	-	-	A	B	A	B
23	-	-	-	-	-	-	-	B	B	B	C	B
24	-	-	-	-	-	-	-	-	B	U110S	110	100
25	-	-	-	-	-	-	-	B	A	U110S	110	120
26	-	-	-	-	-	-	-	B	B	B	A	120
27	-	-	-	-	-	-	-	A	160	B	B	A
28	-	-	-	-	-	-	-	A	B	A	B	120
29	-	-	-	-	-	-	-	-	B	E	B	B
30	-	-	-	-	-	-	-	150	B	A	B	A
31	-	-	-	-	-	-	-	-	A	A	C	C
Median	-	-	-	-	-	-	-	-	-	-	-	120
Count	-	-	-	-	-	-	-	1	1	2	2	5
UQ	-	-	-	-	-	-	-	-	-	-	-	120
LQ	-	-	-	-	-	-	-	-	-	-	-	110
QR	-	-	-	-	-	-	-	-	-	-	-	10

* Tabulation of 120 = 120 km.

IONOSPHERIC DATA
 taken to 25 Mc in 0.5 minute
 March 1965

10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	C	C	C	C	C	C	-	-	-	-	-	-
C	C	A	A	C	C	C	B	-	-	-	-	-	-
C	D120C	120*	E120C	110	B	B	B	-	-	-	-	-	-
C	B	B	B	B	B	B	C	-	-	-	-	-	-
B	A	B	S	B	B	B	B	-	-	-	-	-	-
A	A	C	C	C	B	C	B	-	-	-	-	-	-
B	B	A	A	A	C	A	A	A	-	-	-	-	-
C	C	C	B	B	B	B	B	-	-	-	-	-	-
B	A	B	B	B	B	B	B	-	-	-	-	-	-
B	B	B	B	B	B	B	B	-	-	-	-	-	-
A	B	A	A	A	A	120	B	-	-	-	-	-	-
C	B	B	110	B	B	B	B	-	-	-	-	-	-
110	100	110	115	110	110	110	B	-	-	-	-	-	-
110	120	120	120	120	120	120	A	-	-	-	-	-	-
A	120	B	B	B	A	120	A	-	-	-	-	-	-
B	A	A	U110S	120	120	120	B	-	-	-	-	-	-
B	120	120	120	120	120	120	B	-	-	-	-	-	-
B	B	B	123	120	120	118	B	-	-	-	-	-	-
B	A	A	B	B	B	128	B	-	-	-	-	-	-
C	C	A	A	A	B	A	B	-	-	-	-	-	-
-	120	120	120	120	120	120	-	-	-	-	-	-	-
2	5	4	7	6	5	8	-	-	-	-	-	-	-
-	120	120	120	120	120	120	-	-	-	-	-	-	-
-	110	115	110	110	115	119	-	-	-	-	-	-	-
-	10	5	10	10	5	1	-	-	-	-	-	-	-

Characteristic: fbEs

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in
March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	B	B	-	C	B	C	C	C	C	G
15	C	-	B	B	020	A	B	B	B	B	C	B
16	S	S	B	B	B	M	A	S	-	S	033	035M
17	B	B	B	B	B	A	B	030	030	031M	050M	039
18	-	M	-	-	014	A	A	028M	-	031M	B	B
19	S	B	B	B	C	C	C	C	C	C	C	C
20	B	B	B	B	018	A	A	-	037	B	038	036
21	B	020	B	B	A	A	A	B	032	039	040	G
22	M	020	-	023	-	019M	B	-	032	B	C	B
23	B	B	B	016M	B	-	-	026	034	G	C	G
24	-	B	016M	A	A	B	B	B	029	G	034	G
25	-	B	B	B	015	016M	B	023	030	036	043	048M
26	B	B	B	021M	A	A	026M	031M	034	B	036	G
27	B	M	-	-	A	A	-	023	036	047M	049M	048M
28	B	B	B	M	B	B	B	M	030	035	037	G
29	018	-	B	013	A	M	S	B	029	048M	G	042
30	B	M	M	B	012M	017	-	027	030	0039R	040	034M
31	M	M	B	B	M	017	-	025M	030	030M	C	C
Median	-	-	-	018	015	017	-	027	030	036	039	039
Count	1	2	1	4	5	4	1	8	13	9	10	7
UQ	-	-	-	022	019	018	-	029	034	043	043	048
LQ	-	-	-	015	013	016	-	024	030	031	036	035
QR	-	-	-	7	6	2	-	5	4	12	7	13

* Tabulation of 036 = 3.6 Mc.

to 25 Mc in 0.5 minute

March 1965

10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	036*	039	C	C	C	B	B	051M	M	C	C	C
C	G	G	G	C	G	G	B	C	C	M	C	C	C
C	B	B	B	B	B	035	-	M	-	M	C	C	C
033	035M	B	036M	B	B	B	033	-	-	S	S	S	S
050M	039	C	C	C	A	C	A	A	035M	-	S	S	S
B	B	036	035	036	C	031	029M	029	S	S	S	S	S
C	C	C	B	B	B	B	S	-	S	S	S	B	024
038	036	035	B	B	B	B	B	S	S	S	S	S	036M
040	G	B	B	B	036	035	B	B	B	B	B	B	B
C	B	036	038	035	033	G	B	B	B	B	B	B	B
C	G	B	G	G	G	B	G	B	B	B	026	B	B
034	G	C	043	037	034	B	027	023	M	B	B	025	-
043	048M	052	055	054	041M	054	062M	035M	-	B	B	019	B
036	G	G	038	B	D032R	034	030	026M	B	B	B	B	M
049M	048M	036M	041M	043	042M	057M	040M	049M	B	B	021	B	B
037	G	G	036	G	G	D033R	030	034M	025M	025	020M	027M	021M
G	042	052M	063M	053M	069	060M	023	D	-	022	B	039B	039
040	034M	041	038	B	B	031	034	025	B	B	B	026B	M
C	C	035M	035M	036	B	031	028	026	B	B	B	B	-
039 10	039 7	036 9	038 12	037 7	036 7	035 10	030 10	028 8	035 3	- 2	021 3	026 5	030 4
043 036 7	048 035 13	046 035 11	049 036 13	053 036 17	042 033 9	054 031 23	034 028 6	035 026 9	043 030 13	- - -	024 021 3	033 021 12	038 023 15

Characteristic: foEs

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in

March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	B	B	023	C	B	C	C	C	C	G
15	C	017	B	B	021	024	B	B	B	B	C	B
16	S	S	B	B	B	036M	038M	S	033	S	033	037M
17	B	B	B	B	B	033	B	030	040	046M	070M	043
18	-	030M	018	023	014	030	042	047M	034	040M	B	B
19	S	B	B	B	C	C	C	C	C	C	C	C
20	B	B	B	B	020	023	030	045	037	B	038	042
21	B	020	B	B	030	042	037	B	032	040	040	G
22	047M	031	024	035	023	032M	B	033	038	B	C	B
23	B	B	B	036M	B	018	021	026	034	G	C	G
24	021	B	030M	065M	026M	B	B	B	029	G	034	G
25	023	B	B	B	025	018M	B	023	040	037	043	057M
26	B	B	B	027M	038M	036M	030M	039M	034	B	038	G
27	B	026M	016	030	050M	029	033	023	038	056M	056M	060M
28	B	B	B	026M	B	B	B	038M	030	035	038	G
29	025	021	B	013	036	027M	S	B	029	058M	G	044
30	B	041M	040M	B	018M	018	023	028	030	039R	041	070M
31	040M	026M	B	B	030M	022	029	039M	035	036M	C	C
Median	025	026	024	029	025	029	030	033	034	040	039	044
Count	5	8	5	8	13	14	9	11	15	9	10	7
UQ	044	030	035	036	033	033	037	039	038	051	043	060
LQ	022	021	017	025	021	022	026	026	030	037	038	042
Q ²	22	9	18	11	12	11	11	13	8	14	5	18

* Tabulation of 042 = 4.2 Mc.

to 25 Mc in 0.5 minute

March 1965

[illegible]

Characteristic: h'Es

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 1

March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

Hour Date	00	01	02	03	04	05	06	07	08	09	10	11
1	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	B	B	115	C	B	C	C	C	C	G
15	C	130	B	B	130	130	B	B	B	B	C	B
16	S	S	B	B	B	110	118	S	118	S	110	-
17	B	B	B	B	B	110	B	110	110	105	100	110
18	-	110	105	110	100	100	100	100	110	100	B	B
19	S	B	B	B	C	C	C	C	C	C	C	C
20	B	B	B	B	135	130	120	130	150	B	110	105
21	110	107	B	B	130	110	132	B	140	150	150	G
22	104	102	110	110	110	108	B	110	105	B	C	B
23	B	B	B	110	B	102	130	130	130	G	C	G
24	120	B	100	100	100	B	B	B	140	G	110	G
25	100	B	3	B	100M	120	B	142	100	130	126	125
26	B	B	B	110	106	102	100	130	140	B	U100S	G
27	B	110	110	110	109	110	120	110	150	140	138	105
28	B	B	B	120	B	B	B	110	170	110	160	G
29	115	110	B	155	125	120	S	B	170	145	G	140
30	B	120	125	B	150	130	130	140	160	108	170	100
31	U110S	125	B	B	120	110	110	110	110	110	C	C
Median	110	110	110	110	115	110	120	110	140	110	118	108
Count	6	8	5	8	13	14	9	11	15	9	10	6
UQ	115	123	117	115	130	120	130	130	150	142	150	125
LQ	104	109	103	110	100	108	105	110	110	107	110	105
QR	11	14	14	5	30	12	25	20	40	35	40	20

*
Tabulation of 100 = 100 km.

c to 25 Mc in 0.5 minute

March 1965

[illegible]

Characteristic: Type of Es

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 100 KHz
March 1965

Observed at:
Bangkok, Thailand
Lat. 13.73° N, Long. 100.57° E
105° E Mean Time (GMT + 7 hours)

[illegible]

OSPHERIC DATA
to 25 Mc in 0.5 minute
March 1965

[illegible]

MEDIAN VALUES MARCH 1965

Hour Local	fmin (Mc)	foF2 (Mc)	M(3000)F2	h'F2 (km)	h'F (km)	foF1 (Mc)	M(3000)F1	foE* (Mc)	h'E (km)	fbEs (Mc)	foEs (Mc)	h'Es (km)
00	1.9	7.2	3.30	-	242	-	-	-	-	-	2.5	110
01	1.5	7.6	3.60	-	220	-	-	-	-	-	2.6	110
02	1.3	5.8	3.60	-	210	-	-	-	-	-	2.4	110
03	1.2	3.6	3.45	-	220	-	-	-	-	1.8	2.9	110
04	1.3	2.6	3.40	-	240	-	-	-	-	1.5	2.5	115
05	1.5	2.2	3.45	-	290	-	-	-	-	1.7	2.9	110
06	2.0	2.5	3.10	-	300	-	-	-	-	-	3.0	120
07	2.3	5.6	3.40	-	240	-	-	-	-	2.7	3.3	110
08	2.8	7.3	3.25	285	230	-	-	-	-	3.0	3.4	140
09	3.1	8.3	2.80	315	220	4.2	3.88	-	-	3.6	4.0	110
10	3.3	7.1	2.65	336	210	4.4	3.90	-	-	3.9	3.9	118
11	3.0	7.2	2.60	353	205	4.5	4.00	-	120	4.9	4.4	108
12	3.1	7.4	2.60	350	200	4.5	4.00	-	120	3.6	5.0	100
13	3.0	7.8	2.60	355	200	4.4	4.10	-	120	3.8	4.0	115
14	3.5	8.2	2.65	340	200	4.4	3.97	-	120	3.7	4.0	110
15	3.4	9.1	2.80	320	200	4.3	3.85	-	120	3.6	4.4	117
16	2.6	9.6	3.00	298	228	-	-	-	120	3.5	3.5	114
17	2.5	9.6	3.00	-	235	-	-	-	-	3.0	3.4	113
18	2.5	9.4	3.00	-	260	-	-	-	-	2.8	4.0	110
19	2.3	9.0	2.85	-	280	-	-	-	-	3.5	3.5	110
20	2.0	9.2	2.90	-	290	-	-	-	-	-	3.7	110
21	2.0	8.5	3.15	-	240	-	-	-	-	2.1	3.4	130
22	2.0	8.2	3.20	-	232	-	-	-	-	2.6	3.9	123
23	1.8	7.7	3.13	-	240	-	-	-	-	3.0	3.3	113

* Insufficient data for reliable median.

IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS
BANGKOK, THAILAND
MARCH 1965

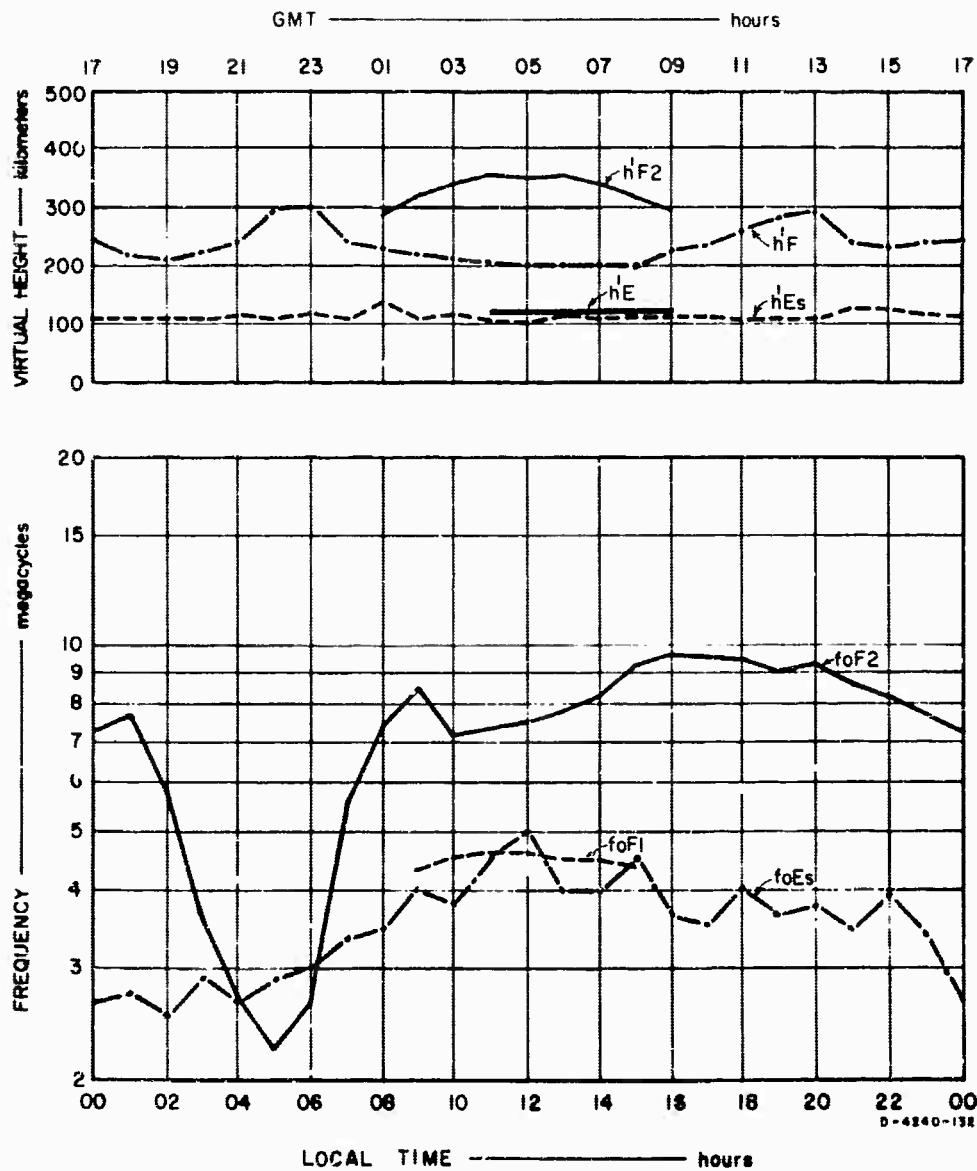


FIG. 1 SUMMARY GRAPHS

STANFORD
RESEARCH
INSTITUTE

MENLO PARK
CALIFORNIA

Regional Offices and Laboratories

Southern California Laboratories

820 Mission Street
South Pasadena, California

Washington Office

808-17th Street, N.W.
Washington 6, D.C.

New York Office

270 Park Avenue, Room 1770
New York 17, New York

Detroit Office

1025 East Maple Road
Birmingham, Michigan

European Office

Pelikanstrasse 37
Zurich 1, Switzerland

Japan Office

c/o Nomura Securities Co., Ltd.
1-1 Nihonbashidori, Chuo-ku
Tokyo, Japan

Representatives

Toronto, Ontario, Canada

Cyril A. Ing
Room 710, 67 Yonge St.
Toronto 1, Ontario, Canada

Milan, Italy

Lorenzo Franceschini
Via Macedonio Melloni, 49
Milano, Italy